## REMARKS

*Status of Claims*

Claims 1 – 28 were original in the application. Claims 1 – 4, 6, 8, 10 – 19, and 21 – 28 have been currently amended. Claims 1 – 28 are submitted as being set forth for examination on the merits.

*The Specification*

The Specification has been amended to correct numeration errors discussed during the interview of Aug. 23, 2007.

*Objection to Drawings*

The Examiner objects to the drawings on the ground that reference character 24 has been used to designate both a substrate in Figs. 1 and 4 and a spring constant in Fig. 2. This is not the case. The spring in Fig. 2 is denoted by reference numeral 28a, 28b or 28c and again the substrate by numeral 24. Numeral 24 is bracketed by "~" symbols to denote it generally identifies the background or the substrate on which the numeral is placed which is also the undelineated background of the figure.

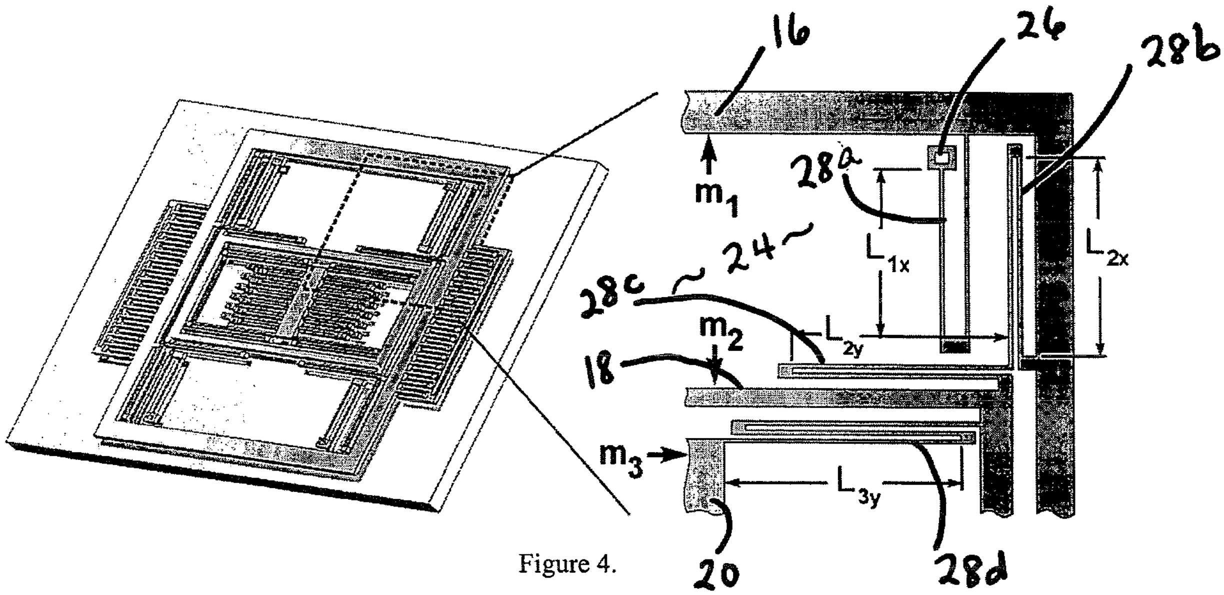


Figure 4.

*Rejection Pursuant to 35 USC 112, Second Paragraph*

Claims 1 – 28 were rejected on various grounds which were further discussed in the interview of Aug. 23, 2007 and based on the interview responsive amendments have been made in each instance.

The Examiner further requested further explanation of the pending claims and the basis for each in the specification.

Claim 1 is directed to a three-mass gyro in which the specifically claimed mechanical constraints on oscillation of the masses results in dynamic decoupling of the drive and sense mode oscillators. Basis if found at Fig. 2 and the related text e.g. paragraphs [049] – [050].

Claim 2 depends on claim 1 and is allowable therewith. Further, claim 2 is directed to a gyro with frequency response curves having a flat nonresonant region.

Operation of the drive and sense mode oscillators within the flat nonresonant region of the drive frequency response curves provide for robustness of design in the face of manufacturing variations. Basis for claim 2 can be found in Figs. 3a, 3b, 6a, 6b, 7a, 7b, 8a, 8b and 9 and the related text, e.g. paragraph [100].

Claim 3 depends on claim 1 and is allowable therewith. Further, claim 3 is directed to a gyro with one of the three masses being an intermediate mass shared between the drive and sense mode oscillators and being larger than the sense mass or the second of the two masses in the sense mode oscillator. Basis for claim 3 can be found for example in paragraphs [11], [95] and [102].

Claim 4 depends on claim 1 and is allowable therewith. Further, claim 4 is directed to a gyro including a drive and sense means and wherein the three masses are alternatively defined as the first, second and third masses. Basis for claim 4 includes the same disclosures as cited for claim 1.

Claim 5 depends on claim 4 and is allowable therewith. Further, claim 5 is directed to a gyro requires the second mass to oscillate in two dimensions and the third mass to act as a vibrations absorber. Additional basis for claim 5 includes paragraphs [13], [18], [20], [50], [87], and [94].

Claim 6 depends on claim 1 and is allowable therewith. Further, claim 6 is directed to a gyro disposed on a substrate, includes a drive and sense means and wherein the three masses are alternatively defined as the first, second and third masses. Basis for claim 6 includes the same disclosures as cited for claim 1.

Claim 7 depends on claim 6 and is allowable therewith. Further, claim 7 is directed to a gyro with the flexures which provide for the claimed motions and

constraints. Basis for claim 7 includes Figs. 1 and 4 and related text e.g. paragraphs [50] and [66].

Claim 8 depends on claim 1 and is allowable therewith. Further, claim 8 is directed to a gyro with a drive and sense oscillator with frequency response curves having an overlapping flat nonresonant region. Basis for claim 8 can be found in the same portions of the disclosure as claim 2 and in paragraph [007].

Claim 9 depends on claim 8 and is allowable therewith. Further, claim 9 is directed to a gyro with a drive and sense oscillator with frequency response curves having matching antiresonance frequencies. Basis for claim 9 can be found in the same portions of the disclosure as claims 2 and 8.

Claim 10 depends on claim 1 and is allowable therewith. Further, claim 10 is directed to a gyro with one of the three masses, one of which is a vibration absorber, and with drive and sensing means. Basis for claim 10 overlap with those portions indicated for claims 3 and 5.

Claim 11 depends on claim 10 and is allowable therewith. Further, claim 11 is directed to a gyro the driving force of the first mass/spring system is at a resonant frequency of the second and third masses/spring systems. Basis for claim 11 includes paragraph [19].

Claim 12 depends on claim 11 and is allowable therewith. Further, claim 12 is directed to a gyro with increased sense amplitude oscillation by the third mass acting as a vibration absorber and the second mass acting as a Coriolis force driver by virtue of its greater mass. Basis for claim 12 includes those cited for claims 3 and 5.

Claim 13 depends on claim 12 and is allowable therewith. Further, claim 13 is directed to a gyro with the second mass acting as a Coriolis force driver and being matched to the frequency of the Coriolis force. Basis for claim 13 includes paragraph [21].

Claim 14 depends on claim 1 and is allowable therewith. Further, claim 14 is directed to a gyro operating in flat regions of the frequency response curves of the drive and sense oscillators with the second and third masses have matching antiresonance frequencies in orthogonal directions together with mass magnitudes and flexures spring constants that maximize operational parameters. Basis for claim 14 includes the same citations as for claim 2 and paragraph [22].

Claim 15 is directed to a method of operating a three mass gyro which decouples the drive and sense oscillators through the claimed constraints. Basis for claim 15 includes the same citations as for claim 1.

Claim 16 depends on claim 15 and is allowable therewith. Further, claim 16 is directed to a method where one of the three masses has its motion increased without driving it at resonance resulting in a more robust performance. Basis for claim 16 includes paragraph [007].

Claim 17 depends on claim 15 and is allowable therewith. Further, claim 17 is directed to a method where the sense mass is excited by an intermediate mass or a mass which is employed in both the sense and drive oscillators. Basis for claim 17 includes paragraphs [011] and [102].

Claim 18 depends on claim 15 and is allowable therewith. Further, claim 18 is directed to a method where the first, second and third masses in the sense and drive

oscillators are constrained and caused to oscillate in specific manner, which results in a decoupled gyro. Basis for claim 18 includes the citations for claims 1, and 15 and paragraphs [012] and [049].

Claim 19 depends on claim 18 and is allowable therewith. Further, claim 19 is directed to a method where the second masses is oscillated in two dimensions and where the third mass is a detected vibration absorber for the second mass. Basis for claim 19 includes the citations for claim 5.

Claim 20 depends on claim 15 and is allowable therewith. Further, claim 20 is directed to a method where the first, second and third masses are selectively oscillated in specific directions through flexures. Basis for claim 20 includes the citations for claim 1, Fig. 2 and related text.

Claim 21 depends on claim 20 and is allowable therewith. Further, claim 21 is directed to a method where the first, second and third masses are selectively oscillated in specific directions through flexures having specific resiliencies. Basis for claim 21 includes paragraph [015].

Claim 22 depends on claim 15 and is allowable therewith. Further, claim 22 is directed to a method of operating a gyro with a common flat region. Basis for claim 22 includes the same citations as for claims 2, 8, and 14.

Claim 23 depends on claim 22 and is allowable therewith. Further, claim 23 is directed to a method of operating a gyro where the antiresonance frequencies of the drive and sense oscillator are matched. Basis for claim 23 includes the same citations as for claims 9 and 14.

Claim 24 depends on claim 15 and is allowable therewith. Further, claim 24 is directed to a method of operating a gyro by absorbing the oscillations of the first mass with a vibration absorber and increasing the oscillations of the vibration absorber. Basis for claim 24 includes the same citations as for claims 5, 10, 12, 16 and 19.

Claim 25 depends on claim 24 and is allowable therewith. Further, claim 25 is directed to a method of operating a gyro with a driving force of the first mass/spring system which is at a resonant frequency of the second and third masses/spring systems. Basis for claim 25 includes the same citations as for claim 11.

Claim 26 depends on claim 15 and is allowable therewith. Further, claim 26 is directed to a method of operating a gyro with certain selected motions for the three masses and mechanically increasing the sense direction oscillation amplitudes in the sense-mode oscillator. Basis for claim 26 includes the same citations as for claims 5, 10, 12, 16, 19 and 24.

Claim 27 depends on claim 26 and is allowable therewith. Further, claim 27 is directed to a method of operating a gyro with the third mass/spring system in resonance with the Coriolis frequency. Basis for claim 27 includes the same citations as for claim 13.

Claim 28 depends on claim 15 and is allowable therewith. Further, claim 28 is directed to a method of operating a gyro selecting oscillating the three masses, operating in flat region of the response curves, and matching the frequencies of the second and third masses in orthogonal directions with a maximized selection of mass magnitudes and spring constants for the second and third mass/spring system. Basis for claim 28 includes the same citations as for claim 14.

*Rejection Pursuant to 35 USC 102e*

Claims 1, 15, 17 and 20 were rejected under section 102e based on Willig.

Regarding claim 1, the Examiner cited Willig as disclosing a micromachined gyroscope comprising a drive mode oscillator formed by interconnected masses 100 and 102, and a sense mode oscillator comprising interconnected masses 100 and 140. The Examiner did not give the limitation that "the drive-mode oscillator and the sense mode oscillator are mechanically decoupled" any weight. Furthermore, the Examiner contended that drive-mode oscillator (100 and 102) and the sense mode oscillator (100 and 140) are "mechanically decoupled" in the sense that the drive mass 102 is restrained from motion in the Y direction in response to Coriolis forces derived from the motion of the mass 100 in the X direction, in the same manner that the mass 16 of applicant is restrained from motion in the sense (y) direction in response to Coriolis forces derived from the motion of the masses 18 and 20 in the drive (x) direction.

As shown and described in connection with Fig. 2, claim 1 as amended is distinguished from Willig in that all the masses in the gyro form part of the drive oscillator, and only two of the masses are included in the sense oscillator. Mass 16 is driven but in turn drives masses 18 and 20 in the drive direction with it. Only masses 18 and 20 oscillate in the sense direction as constrained by the flexures. Mass 16 is constrained from motion in the sense direction by the flexures.

In Willig the three masses have a different dynamic and structural topology. Mass 102 is driven only in the drive direction and drives mass 100 with it, but not mass

140 which is constrained by flexures 141 to move only in the sense direction. The Coriolis force also drives mass 100 in the sense direction which motion is then coupled into mass 140. In Willig two masses 102 and 100 move in the drive direction and two masses 100 and 140 move in the sense direction.

In claim 1 as amended, three masses 12, 18 and 20 move in the drive direction and two masses 18, 20 move in the sense direction. The relative motion of masses 18 and 20 with respect to each other is constrained to the sense direction only, although both masses move relative to the substrate in both directions. This structural difference as reflected in the constrained motions results in claim 1 as amended having a scope which does not include Willig. Alternatively, each and every element of claim 1 as amended is not disclosed by Willig.

Regarding claim 15, the Examiner contended that the motion of the drive-mode oscillator (100 and 102) is decoupled from the motion of the sense mode oscillator (100 and 140) in the sense that the drive mass 102 is restrained from motion in the Y direction in response to Coriolis forces derived from the motion of the mass 100 in the X direction, in the same manner that the mass 16 of applicant is restrained from motion in the sense (y) direction in response to Coriolis forces derived from the motion of the masses 18 and 20 in the drive (x) direction.

Claim 15 as amended is directed to a method of nonresonantly operating a micromachined gyroscope and is distinguished from Willig as follows. As shown and described in connection with Fig. 2, claim 15 requires oscillating relative to the substrate the three interconnected masses in the drive direction, and oscillating relative to the

substrate two masses out of the three interconnected masses in the sense direction. Willig does not oscillate all three masses in the drive direction relative to the substrate. Mass 140 is fixed relative to the substrate in the drive direction. Claim 15 further requires mechanically constraining relative motion of the two sense masses with respect to each other to the sense direction. This results in a decoupling of the oscillation in the drive direction of the one constrained mass of the drive-mode oscillator from relative oscillation in the sense direction of the two masses. Willing does not mechanically constraining relative motion of the two sense masses with respect to each other to the sense direction.

In other words, claim 15 includes the distinguishing step of mechanically constraining *relative motion of masses 18 and 20* to the sense direction, so that oscillation in the drive direction of the one constrained mass 16 of the drive-mode oscillator is dynamically decoupled from oscillation in the sense direction of the masses 18, 20 of the sense-mode oscillator. In Willig the masses 100, 140 of the sense mode oscillator are not constrained in their *relative motion* to the sense direction, but their *relative motion* is constrained only in the drive direction. A frame of reference riding on either mass 100 or 140 will see no relative motion between the two masses 100 or 140 in the sense direction, but only motion in the drive direction. Again, all three masses 100, 102, 140 of Willig do not oscillate in the drive direction. Mass 140 oscillates only in the sense direction relative to the substrate.

Therefore, it cannot be maintained that each and every step of claim 15 as amended is disclosed in Willig.

Advancement of the claims to issuance is requested.

Respectfully submitted,

Daniel L. Dawes
Registration No. 27123
Myers Dawes Andras & Sherman LLP
19900 MacArthur Blvd., 11th Floor
Irvine, CA 92612
(949) 223-9600

# APPENDIX